



**THE DIGITAL EDGE:  
MIDDLE-SKILL WORKERS  
AND CAREERS**

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# EXECUTIVE SUMMARY

For an increasing number of American workers, the term “middle-skill” has come to mean “digital skills.” Some 82% of middle-skill jobs are now “digitally intensive,” a 4% increase over the past two years. Even more importantly, the digital skills marketplace is sorting out into clear pathways for workers to advance, a vital component if middle-skill workers are to remain middle class.

Burning Glass Technologies, in partnership with Capital One and following up on work done in 2015, has conducted this study to understand the future of middle-skill jobs. These reports focus on the role of digital skills in opening doors for job seekers without a college degree, a group that encompasses two-thirds of Americans.

Middle-skill jobs remain fractured between the digital haves and have-nots. The number of jobs with digital skill requirements is growing faster, and the jobs pay more and offer greater opportunity for career advancement than jobs without those requirements.<sup>1</sup> By contrast, the jobs that don’t require digital skills are concentrated in only a few industries, such as transportation and construction.

Middle-skill jobs, defined as those that typically require less than a bachelor’s degree while paying a living wage,<sup>2</sup> comprise 46% of overall labor demand. Amidst changing technology and job responsibilities, the demand for digital skills continues to expand across the labor market and into new jobs. Workers seeking to stay ahead of job market changes will need to acquire appropriate digital skills for career advancement. Many of these skills are “stackable,” meaning they can be used as building blocks to acquire more advanced skills as workers advance through their careers.

Additionally, digitally intensive positions represent opportunities for workers to achieve upward mobility. While the demand for higher education increases,<sup>3</sup> opportunities for individuals without a degree increasingly rely on the ability to demonstrate specific proficiencies. Digital proficiencies open doors to jobs with family-sustaining wages across industries.

## Digital skills serve three key functions for middle-skill job seekers:

- **Serving as a door opener to the middle-skill market:** Baseline skills, such as word processing and spreadsheets, are in demand across a range of occupations and in a range of industries, serving as a doorway into middle-skill jobs.
- **Providing career advancement in lieu of advanced education:** Development of key digital skills can replace the educational requirements for many occupations, and advance individuals in their careers.
- **Defining a set of domain-specific competencies for specialized roles:** Many middle-skill roles are defined by digital skills; these include health care technology, health informatics, and manufacturing positions. For success, these jobs require a narrow set of specific skills.

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<sup>1</sup> Moving the Goalposts: How Demand for a Bachelor’s Degree Is Reshaping the Workforce. <http://burning-glass.com/research/digital-skills-gap/>

<sup>2</sup> The living wage is based on the MIT Living Wage Calculator, <http://livingwage.mit.edu/>. This report uses \$15/hour as the living wage.

<sup>3</sup> Moving the Goalposts: How Demand for a Bachelor’s Degree Is Reshaping the Workforce. <http://burning-glass.com/research/credentials-gap/>

**Importantly, digital skills are in broad demand across the middle-skill labor market.**

- **More than 8 in 10 middle-skill jobs (82%) require digital skills, a 4% increase since 2015:** Spreadsheets and word processing remain the baseline for digital skills, with 78% of middle-skill jobs calling for these at a minimum.
- **Digitally intensive middle-skill jobs pay more than non-digital middle-skill jobs:** Baseline digital skills alone pay a 17% premium over non-digital roles. Overall, middle-skill jobs average \$20 per hour; those with advanced digital skills such as IT networking or Customer Resource Management software can command salaries at or above \$28/hour, which places them in the top quartile of all earners.
- **Digital skills provide a career pathway into middle- and high-skill jobs:** Nearly one million middle-skill jobs in 2016 paid less than the living wage of \$15/hour in 2013. But as the digital intensity of these roles increased, so did salaries rise to a living wage.
- **Digital middle-skill jobs represent roughly 38% of overall job postings:** In examining the top 10 metropolitan areas, we found some regions have higher proportions of these jobs than others, ranging from 33% in San Francisco and Washington D.C. to 42% in Houston.
- **Non-digitally intensive middle-skill jobs are clustered in transportation, construction, and installation/repair.** Put another way, digital skills have become the minimum entry point for middle-skill jobs in most other sectors.

## METHODOLOGY

To provide the information contained in this report, Burning Glass has mined its comprehensive database of nearly 27 million online job postings collected in 2016. Burning Glass's spidering technology extracts information daily from more than 40,000 online job boards, newspapers, and employer sites and de-duplicates postings for the same job, whether it is posted multiple times on the same site or across multiple sites. Burning Glass's proprietary data are supplemented and contextualized by additional indicators from the Bureau of Labor Statistics and other published sources. All data in this report are sourced from Burning Glass's database, except where indicated. Also, all Burning Glass data in this report are based on the full span of U.S. job postings collected by Burning Glass in 2016.

**The digital skills that are most important to middle-skill jobs can be grouped into three broad categories:**

***Productivity Software Skills***, such as using spreadsheets and word processing programs, are required for the vast majority of middle-skill job seekers. These skills serve as an entry point into middle-skill roles, upon which additional skills may provide opportunities to advance.

**Advanced Digital Skills** provide direct opportunity for career advancement, both in middle-skill and toward high-skill occupations. These skills, such as Digital Media and Computer Networking, provide middle-skill jobs with strong salaries, and are critical in high-skill jobs.

**Occupationally Specific Digital Skills** represent a set of specific skills required to work in specific technical occupations. For example, work as a Radiologic Technologist cannot be done without understanding the operation of x-ray machines and CT imaging.

For this report, middle-skill occupations are those where fewer than 80% of job postings call for a bachelor's degree, and that also offer a median hourly wage above the national living wage (\$15/hour).

## Digital Skill Clusters

Digital skills have been split into a number of clusters, as defined by Table 1. Advanced digital skills have been broken into clusters built around a specific set of similar skills. Similarly, three groups of occupationally specific digital skills have been defined.

**Table 1: Digital Skill Clusters**

Digital Skill Type	Digital Cluster	Description
Baseline Digital	Productivity Software	Use productivity software skills, such as Word and Excel
Advanced Digital Skills	Programming Skills	Programming and scripting languages
	Computer and Networking Support	Support computer systems and networks
	Customer Relationship Management	Use CRM software, such as Salesforce or Oracle CRM
	Digital Media and Design	Use digital production, graphic design, online advertising skills
	Social Media	Leverage social media tools to advance work
Occupationally Specific Digital Skills	Health Care Technology	Understand specific technical tools within a health care setting
	Health Information Technology	Interact with information tools within a health care setting
	Machining Technology	Use machining and engineering software and tools

## DIGITAL SKILLS PATHWAYS

Digital skills provide a level of “future-proofing” for job seekers, as the skills are critical to jobs at lower risk of future automation. Generally speaking, digital skills enhance analysis and creativity, skills that are less likely to be supplanted by machines. Additionally, digital skills allow workers to advance proactively through their careers. By learning high-demand digital skills, employees can advance through their careers with skill sets to increase their attractiveness to the market.

**There are three categories of digitally intense occupations explored here:**

- **Door Openers:** These are middle-skill occupations with a high demand for digital skills, but which are typically entry level and do not regularly require a bachelor’s degree.
- **Career Advancers:** These positions are more advanced in both the level of required experience and the sophistication of the required digital capabilities than their feeder positions.
- **Specialized Roles:** A set of specialized roles, especially in manufacturing and health care, that require domain- or even role-specific digital skills. This requires a base digital competency for workers to enter the profession.

## DIGITAL SKILLS AS DOOR OPENERS

Digital skills, especially productivity software skills, are now critical door openers into most corners of the middle-skill job market. More than one-third (36%) of middle-skill jobs are in occupations whose only digital requirements are for productivity software skills. This accounts for more than four million annual job postings. Nonetheless, these roles pay a 17% premium over non-digital skills (\$23.17 vs. \$19.81) and they run across the market, from clerical positions to basic finance roles and sales. Importantly, in several of these career areas, all middle-skill job openings fall in digitally intensive occupations. These digital skills are absolute requirements for entering those careers.

Equally important, these productivity software skills are often singular requirements for these jobs and provide a discrete, readily attainable pathway to employment. In areas such as Clerical, Customer Service, and Business Management, the digital skill demand for middle-skill job seekers is almost entirely in productivity software, while advanced positions request skill sets that are more technical, such as use of CRM software and digital design software. With the appropriate skills, these areas represent strong opportunities for entry-level job seekers, since 53% of job postings are for entry-level candidates.

Door opener skills span a range of careers, including technology jobs, office-based jobs, and roles in skilled trades. Table 4 displays the top occupations requiring digital skills that represent door openers into the middle-skill workforce. These occupations have relatively low demand for bachelor’s degrees and offer high levels of entry-level opportunity. Several of these occupations represent the first rung in a career ladder into high-paying jobs. These jobs all demand skill with productivity software, but several require additional digital skill clusters useful for career advancement.

These occupations also demonstrate the expansion of digital skills into new areas. For example, as automobiles become more complex and computerized, the technicians who service them must possess digital skills to perform even basic diagnostics and to undertake routine service record maintenance.

**Table 4: Top Door-Opener Occupations, Overall**

Occupation	Postings	Median Salary	Requesting Bachelor's Degree	Entry-Level	Digital Skill Clusters Beyond Productivity
Sales Representative	819,754	\$24.86	55%	51%	CRM
Customer Service Representative	611,581	\$15.25	16%	76%	
Office / Administrative Assistant	454,970	\$16.31	21%	60%	
Bookkeeper / Accounting Clerk	243,290	\$17.91	35%	62%	
Maintenance Technician	188,514	\$17.61	0%	54%	Machining Tech
Computer Support Specialist	186,566	\$23.38	45%	55%	Networking
Automotive Service Technician / Mechanic	136,678	\$18.20	0%	52%	
Insurance Sales Agent	125,007	\$23.17	28%	53%	CRM

In fact, each skill cluster holds within it the path to door opener roles other than the ones made accessible by a knowledge of basic productivity software (see Table 5). For example, CRM software is a key skill requirement for sales and financial roles—so much so that job seekers considering such roles are well advised to learn to use CRM software. The rise of digital photography means photographers need digital media skills and social media skills, so they can promote their work and gain a following.

**Table 5: Top Door Opener Occupations by Digital Cluster**

Productivity Only	CRM	Digital Media	Social Media
Customer Service Representative	Sales Representative	Advertising Sales Representative	Photographer
Office / Administrative Assistant	Insurance Sales Agent	Photographer	Real Estate Agent / Broker
Bookkeeper / Accounting Clerk	Loan Officer	Audio / Visual Technician	Career Counselor
Automotive Service Technician / Mechanic	Personal Banker / Banking Sales Staff	Broadcast Technician	
Repair / Service Technician	Financial Services Sales Agent		
Loss Prevention / Asset Protection Specialist			
Scheduler / Operations Coordinator			

\*Door opener occupations are those where most job postings are for entry-level positions, and which are not “manager” occupations.

# DIGITAL SKILLS AS CAREER ADVANCERS

Workers will increasingly find that digital skills are crucial to climbing career ladders. This may require learning complex skills, such as in network infrastructure, and adding networking certifications to advance into Network / Systems Administrator positions. We also see the demand for productivity software in management roles across industries. In Retail, Construction, Production, and Maintenance, the ability to use productivity software is a prerequisite to advancement.

The types and uses of digital skills in these occupations vary. Recruiters, for example, make heavy use of social media tools such as LinkedIn and Twitter to identify and attract talented workers. Construction Managers are required to have productivity software skills, such as Microsoft Excel, to support the efficient management of projects; often, these jobs also call for a working knowledge of CAD software.

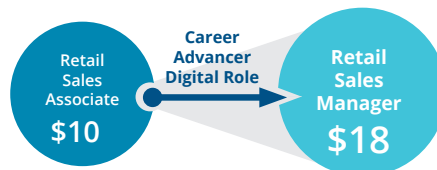
**Table 6: Highest Demand Career Advancer Occupations\***

Occupation	Postings	Median Salary	Requesting Bachelor's Degree	Entry-Level	Digital Skill Clusters Beyond Productivity
Retail Store Manager / Supervisor	496,893	\$18.42	29%	56%	
Human Resources / Labor Relations Specialist	170,697	\$28.06	66%	41%	
Account Manager / Representative	137,764	\$26.79	70%	32%	CRM
Network / Systems Administrator	135,125	\$37.41	79%	19%	Networking
Recruiter	117,445	\$28.06	72%	49%	Social Media
Office Manager	83,764	\$25.30	49%	36%	
Maintenance / Service Supervisor	75,234	\$30.29	31%	24%	Manufacturing Technology
Computer Programmer	74,061	\$38.24	79%	24%	Programming

*\*Note: Does not include Health Care occupations.*

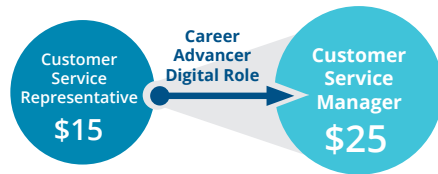
As with the door opener occupations, the individual digital skill clusters help to define a trajectory for career advancement. CRM skills, for example, lead to more advanced sales roles, and are necessary for Customer Service Managers, while postings for entry-level representatives did not have this demand. Similarly, in both digital media and social media, we see several roles defined by their skill set, rather than a set of academic credentials, that provide opportunity for career advancement without a degree.

Career advancement is possible with all digital skill clusters. For example, productivity software provides advancement into management positions in retail; managers are more than 2.5 times as likely to require productivity software skills as non-managers.





A similar pattern arises in customer service. Customer Service Representatives have a high demand for productivity software skills. Advancement to management requires more proficiency in Customer Relationship Management software such as Salesforce, as these roles require both support of customers and broader measurement around success in these relationships, through generating and assessing reports from CRM software.



**Table 7: Top Career Advancer Occupations by Digital Cluster**

Productivity Only	CRM	Digital Media	Social Media
Human Resources / Labor Relations Specialist	Account Manager / Representative	Graphic Designer / Desktop Publisher	Hotel Manager
Office Manager	Sales Supervisor	Writer	Event Specialist
Construction Manager	Banking Branch Manager	Mechanical / Electrical Drafter	Videographer
Executive Assistant	Customer Service Manager	Document Control / Management Specialist	Recruiter
Production Supervisor	Medical Office / Practice Manager	Geographer / GIS Specialist	
Payroll Specialist	Call Center Manager	CAD Designer / Drafter	
Operations Manager / Supervisor		Artist / Illustrator	

## SPECIALIZED ROLES

Specialized roles provide a strong set of entry-level opportunities for individuals with the appropriate digital skill sets. Most of these are health care jobs, such as health technician roles, that rely on specific digital understanding but are often entry level. In the industries requesting these Occupationally Specific Digital Skills, 87% of the jobs are likely to be entry level, and more than 50% of postings call for less than two years of experience.

These occupations do not have the broad set of training requirements that were seen in many occupations above; rather, these roles require very specific, that is, career-defining, skill sets to enter the profession (Table 8).



**Table 8: Career-Defining Digital Skill Occupations**

Career-Defining Clusters		Top Occupations	
Health Care Technology	Registered Nurse	Laboratory Technician	Health Technician / Technologist
Health Information Technology	Medical Secretary	Registrar / Patient Service Representative	Claims Specialist / Adjuster / Examiner
Machining Technology	Maintenance Technician	Machinist	Mechanical / Electrical Drafter

## IMPLICATIONS

- Digital Skills Promote Advancement along Career Pathways:** In addition to serving as baseline requirements to enter the market, digital skills provide concrete steps for movement toward higher paying jobs in career pathways. Employees adding additional digital skills have precise opportunities to advance.
- Productivity Software Is a Baseline Requirement:** Productivity software is a basic requirement across the market. Eight in 10 (78%) of middle-skill jobs demand facility with productivity software, and these digital jobs pay a premium over non-digital middle-skill roles. Additionally, productivity software is necessary for upward movement. Managerial roles across career areas, not only in offices but also in manufacturing and retail, rely heavily on word processing and spreadsheets.
- Expand the View of Digital Demand:** While advanced digital skills, especially coding and programming, are in high demand in high-skill occupations, there is a large set of digital skills that open opportunities for middle-skill workers. Basic CRM skills, such as use of Salesforce, and social media skills, are door openers into several high-paying career areas.
- Strategically Target Advanced Skills:** Within each digital cluster, specific skills open doors to advancement. These skill clusters are growing, and offer strong opportunity for middle-skill job seekers. Similarly, improving digital media skills into more complex online marketing opens new doors for job seekers.
- Occupationally Specific Digital Roles Provide Clear Pathways:** The occupationally specific digital occupations require narrow, defined sets of skills that enable job seekers to enter the market. These roles, especially in health care, are also particularly free from risk for computerization.

## SUPPLEMENTARY TABLES

**Table A: Middle Skills Overview**

Digital Skill Cluster	Postings	All Middle-Skill Demand	Posting Growth	Median Salary
<b>Baseline Digital Skills Only</b>	<b>4,261,337</b>	<b>36%</b>	<b>31%</b>	<b>\$23.17</b>
<b>Advanced Digital Skills Required</b>				
Programming	644,637	5%	30%	\$28.11
Customer Relationship Management Software	1,438,074	12%	35%	\$26.61
Digital Media & Design	232,981	2%	22%	\$21.69
Networking & Systems	374,306	3%	31%	\$29.14
Social Media	350,672	3%	48%	\$23.51
<b>Occupationally Specific Digital Skills Required</b>				
Health Care Technology	1,845,549	16%	159%	\$30.05
Health Information Technology	642,096	5%	55%	\$20.02
Manufacturing Technology	621,179	5%	28%	\$22.56
<b>DIGITAL TOTAL</b>	<b>9,635,663</b>	<b>82%</b>	<b>47%</b>	<b>\$23.94</b>
<b>NON-DIGITAL ROLES</b>				
<b>Non-Digital</b>	<b>2,139,239</b>	<b>18%</b>	<b>30%</b>	<b>\$19.81</b>

**Low-Skill:** Occupations that require less than a bachelor’s degree and pay an hourly median wage below the national living wage.

**Non-Digital Middle-Skill:** Occupations where fewer than 80% of postings call for a bachelor’s degree, hourly median wage is above the national living wage, and job postings do not call for any digitally intensive skills.

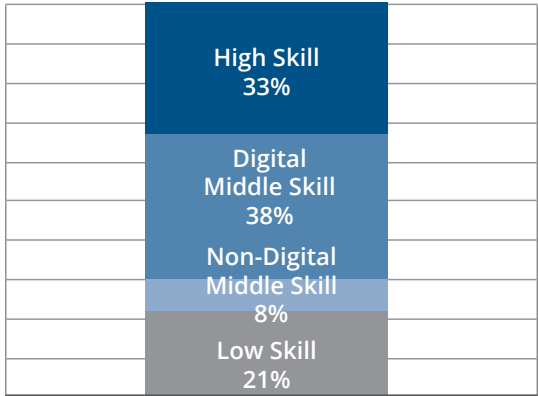
**Digital Middle-Skill:** Occupations where fewer than 80% of postings call for a bachelor’s degree and hourly median wage is above the national living wage. These occupations also call for baseline health care, machining technology, or advanced digital skill sets.

**High-Skill:** Occupations where more than 80% of postings call for a bachelor’s degree or higher.

**Table B: Middle-Skills Overview: Occupation Family Breakdown**

Occupation Family	Middle-Skill Postings	Total Postings in Middle-Skill	Digitally Intensive Middle-Skill Postings	Middle-Skill Postings in Digitally Intensive	Middle-Skill Postings in Advanced Digital
Health Care	2,513,461	54%	2,400,061	95%	3%
Transportation	1,757,125	86%	12,533	1%	0%
Sales	1,608,705	46%	1,608,427	100%	69%
Maintenance, Repair, and Installation	770,127	97%	675,797	88%	2%
Clerical and Administrative	765,346	76%	765,346	100%	0%
Finance	763,254	45%	763,254	100%	41%
Customer and Client Support	651,152	89%	644,586	99%	5%
Business Management and Operations	526,827	37%	524,477	100%	0%
Information Technology	420,596	16%	420,596	100%	100%
Construction, Extraction, and Architecture	371,043	93%	244,131	66%	0%
All Other	1,627,266	25%	1,576,455	97%	72%

**Table C: Distribution of Demand**



Percentage of Total Demand

Skill Level	Total Postings
Low-Skill	5,329,667
Middle-Skill	11,774,902
Non-Digital	2,139,239
Digital	9,635,663
High-Skill	8,246,268
Grand Total	25,350,837

# ABOUT THE PROJECT PARTNERS

## About Capital One

Capital One is investing \$150 million in community grants and initiatives over five years to help empower more Americans to succeed in an ever-changing digitally-driven economy. With Future Edge, Capital One will collaborate with leading educational and community organizations across the country to address areas of critical need that impact the nation's current and future ability to grow and prosper in the digital age.

<https://www.capitaloneinvestingforgood.com/>

<https://twitter.com/yourfutureedge>

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## About Burning Glass Technologies

Burning Glass Technologies delivers job market analytics that empower employers, workers, and educators to make data-driven decisions. The company's artificial intelligence technology analyzes hundreds of millions of job postings and real-life career transitions to provide insight into labor market patterns. This real-time strategic intelligence offers crucial insights, such as which jobs are most in demand, the specific skills employers need, and the career directions that offer the highest potential for workers. For more information, visit <http://burning-glass.com/>.

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